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That is to say, with the money lost in the present system, the plan for the effective occupation of the upper Kwango-Kasai on the lines of health and comfort could be readily carried out. Besides this, there would be permanent colonies possible in these uplands, lands could be sold at a good profit, agricultural products raised and shipped, and the whole region brought under the definite régime of genuine colonial enterprise.

A noteworthy illustration of the method here advocated is afforded in the case of the French possessions in the upper Niger. As the English held the lower river, the French were obliged to get into their upper Niger territory by just such a plan as herein outlined, from the West Coast at Dakar. While all of the principles laid down above were not fully embraced in the French scheme, still the French Nigerian colony bids fair to be a standing object lesson in colonial development as a result of the government having been forced to adopt this method more or less completely. One now goes from Paris to Timbuktu all the way by steam, and in greater comfort and speed than would ever have been possible by ascending the Niger.

NOTES ON THE DESCRIPTION OF LAND FORMS.—II.*

LE RELIEF DU LIMOUSIN. By A. Demangeon. (*Ann. de Géogr.*, xix, 1910, 120-149.) There are some geographical articles which leave their readers with a confused sense of being lost in a maze of vaguely conceived hills and valleys, mountains and plains, where item follows item without plan or correlation. There are other articles from which the reader derives a clear picture of definitely conceived forms, grouped in an easily comprehended arrangement. The essay here cited on the Relief of the Limousin, a district in the northwestern part of the central plateau of France, by the professor of geography in the University of Lille, is an exceptionally fine example of an article that gives its readers a clear picture of the landscape that it describes.

The Limousin district, consisting for the most part of disordered crystalline rocks, overlapped on the north and west by gently inclined stratified formations, is over much of its area an uplifted peneplain, standing at altitudes increasing southeastward from 300 to 500 meters; but it is surmounted by scattered or grouped remnants of a still higher peneplain (800-900 meters) of earlier origin, and it is imperfectly dissected by young or mature valleys of later origin. Three cycles of erosion are thus recognized: Traces of the first are still preserved in the solitudes of the broadly rolling highlands, chiefly on the most resistant rocks, whence the rivers Cher, Creuze, Vienne and Dordogne radiate. The work of the second cycle has over the greater area destroyed the highlands of the first cycle, in producing the wide-spread peneplain of the uplands, the even surface of which traverses various rock structures indifferently; but the peneplain is often surmounted by unconsumed cones, domes and ridges; and where the higher reliefs are grouped in the still preserved highlands of the first cycle, the work of the second is seen only in broad valley heads that appear as open embayments in the highland border. The work of the third cycle begins where the streams of which the headwaters flow in broad and shallow valleys on the peneplain, or in the valley-head embayments, and entrench themselves in narrow, young gorges, which rapidly deepen beneath the upland valley floors, and become well graded and maturely open valleys of the third cycle on reaching the stratified rocks, if not sooner. Thus it appears that the general land surface in the first cycle reached old age even on the hardest rocks; that in the second cycle it reached old age over large areas on crystalline and stratified rocks alike, but that it reached only late maturity at certain points where highland residuals remain; and that the third cycle is still generally young, although the valleys far down stream have reached maturity, and some of the weaker stratified formations are already maturely dissected.

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* No. I appeared in the *Bulletin* for September, pp. 671-675.

Whenever the description of a district can be reduced to a definite scheme of this sort, any local part of the district, such as a hill, an upland, a slope or a valley, can be quickly apprehended, as well for itself as in its relation to neighboring parts. The reader's imagination is thus easily lead to follow the writer's understanding of the observed facts. When an outline map and a series of excellent photographs are appended, as in this account of the Limousin, there is little left for the reader to desire, except to see for himself the district, with whose interesting features he already feels familiar.

The author of this article follows the inductive method of presentation. He opens his exposition by citing examples of empirically described forms, located with reference to small villages and streams, the names of which, probably unfamiliar even to many French readers, may be found on the large-scale maps to which reference is made in foot notes. For example: "If one advances from Bellac on the Vincou toward the village of Blond on the south, the valley of the Vincou is crossed at an altitude of 180 m.; then on ascending the left slope of this valley, one reaches at about 285 m. a plateau which continues for several kilometers at about 290 or 300 m.; the plateau is a platform of crystalline schists. faintly undulating with gentle depressions, covered with fields and woods. At last, suddenly, in the neighborhood of Blond, massive highlands rise in rounded forms to altitudes exceeding 500 m." In association with several similar accounts, a little later one reads: "We have, here as well as there, the same two topographical elements; first massive highlands, and next a platform on which the highlands rest. In this platform the present valleys are excavated." After three pages of these empirical details, a page is given to a general account of the highlands, and three pages to the platforms or plateaus; and only on the ninth and tenth pages of the article, after the reader has inevitably discovered for himself that he has to do with a district of three cycles of erosion, is the explanatory scheme of the three cycles explicitly set forth.

Is it not worth considering whether the explanatory scheme should not be placed, for the convenience of the reader, on the first page of an article of this kind? The scheme offers no particular difficulty to the understanding; it is not a venturesome proposition which needs a gradual introduction in order to persuade the reader to accept it; it is simply a new example of an explanatory or genetic conception of land forms that must now be familiar to every modern physiographer. True, in the course of his investigation, the observer must accumulate his items of fact, one by one, as his field studies advance; only after such a beginning can he reach an inductive generalization. He may perhaps at the outset not at once understand what he sees, and in such a case his earlier notes must necessarily be in empirical terms. It may be only near the end of his records that a well conceived and concisely phrased scheme embracing all his results is elaborated; though in a district where the relation of forms is so manifest as would seem to be the case in the one here treated, a growing suspicion as to its evolution might have been written down along with the notes of the walk described in the introductory paragraph, quoted above; and a strong persuasion or even a conviction of the truth of the suspicion might have been noted with the records of the second or third experience of this kind. But when it comes to presenting the results of the investigation, is not the convenience of the reader greatly served by reversing this order, and concisely announcing the conclusion at the outset; so that, as the reader afterwards comes upon the separate items of fact, he may at once place each one where it belongs, instead of having to carry it in uncertain position in his memory until the conclusion, unnecessarily delayed, is at last disclosed? Experiment in this direction is worth making.

SCHLESWIG-HOLSTEIN. By K. Olbricht. (*Geogr. Zeitschr.*, xv, 1909, 315-332.) If there are still some geographers who are uncertain as to the relative value of the explanatory as compared with the empirical method of describing land forms, here is a second article which should lead them far towards a decision in favor of the former and more rational method. Its readers learn that the peninsula which includes Jutland (the mainland part of Denmark) on the north and Schleswig-Holstein on the south, is made up of a series of subparallel elements, arranged in meridional belts, the axial member being a young terminal moraine. On the east the moraine is adjoined by a rolling drift surface of uneven hills and hollows, often holding lakes in the south and repeatedly traversed by shallow west-east troughs. On the other side of the moraine is a west-sloping moorland of outwashed sand, spread forward on a gently undulating surface of older drift, through which some isolated masses of still older drift rise here and there, especially in the south; and on the west border of which the waves and the winds, sweeping in from the whole breadth of the North sea, have submaturely retrograded the originally irregular shore line and thrown up a belt of dunes next inland from the gently sloping beach. The west-east channels east of the moraine are explained as valleys, normally eroded in layers of gravel and till, and enlarged by the last advance of the ice, which furthermore scoured and roughened the neighboring partly dissected drift surface of an earlier advance, sometimes producing drumlins; it was this advance of the ice that formed at its western border the terminal moraine which now constitutes the axis of the peninsula. Some of the streams of the western slope rise a little east of the moraine and make their way through it in notches.

The northern part of the peninsula, or Jutland, still retains a good part of its original breadth, although the enclosed bays between the truncated headlands of its west coast, as well as the islands on the east coast, suggest some diminution by moderate submergence before or during the development of the present shoreline. The southern part, or Schleswig-Holstein, has been reduced to half the breadth of Jutland by greater submergence. Thus a good part of its former eastern extension has been cut off in scattered islands, its present eastern shoreline has become extremely irregular, and the channels in the eastern belt of rolling drift are now occupied by slender arms of the sea, or Föhrden, which reach nearly or quite to the axial moraine; while on the west the outer part of the older undulating drift surface is drowned, and the dunes that formerly rose on it in a presumably continuous line, such as still exists along the west coast of Jutland, are broken and worn back in discontinuous islands, which very imperfectly enclose an area of high-tide marsh and low-tide mud flats. With the exception of the vigorous attack of the sea on the west coast, post-glacial erosive processes have had little effect; nearly all the surface still remains about as it was left when the last ice sheet vanished.

The meaning of the contrasts in breadth and outline of the southern and northern parts of the peninsula is thus made clear and easily remembered. Each element of existing form is presented as the product of sufficiently defined general processes; and the relation of the several meridional belts to each other, both in their original breadth and in their present unequally diminished breadth, is easily understood. On a rational basis of this kind, local details and place names are easily added. For example, the broken dune-islands of Schleswig are known as Fanö (this one belonging politically in Jutland), Römö, Sylt, Amerum, and so on, and constitute as a group the North Frisian islands: the southeasternmost member of the series is still attached to the mainland by a strip of marsh. Tondem, Husum, Itzehoe and other towns on the west, south as far as Hamburg, lie on tidal streams where the dry moorland meets the wet marshes; Hamburg gains importance over its less known neighbors, because of being situated on the Elbe, whose valley brings it into relation with much of North Germany. Hadersleben, Apenrade, Flensburg, Schleswig, Kiel and Lübeck are all at or near Föhrden-heads, east of the axial moraine.

The author announces his intention at the outset of giving a general view of geographical relations. In view of this object, he makes what the present reviewer is disposed to regard as a mistake in introducing a variety of geological details, for which no particular geographical application is found—a mistake for which much countenance may be found in many geographical essays of recent years, especially in Germany. A number of statements are of purely geological import, such as the thickness, deformation and erosion of the underlying Cretaceous and Tertiary formations; and these statements are moreover frankly recognized as largely hypothetical, because they are based more on the results of scattered borings than on surface observations, outcrops being very scanty. Similarly, certain accounts of the earlier glacial deposits are chiefly geological rather than geographical, because they are largely concerned with the order of past occurrences, as indicated by the succession of buried drift sheets; and because, with the small exception of the isolated hills of older drift mentioned above, these past occurrences do not bear directly on the features of the present landscape.

The reason for the introduction of irrelevant geological matters in a geographical essay of this kind is perhaps to be found in the extraordinary abundance, value, and detail of geological studies in Germany, and indeed in Europe generally. A geographer has almost to go out of his way to avoid being entangled in them, for they abound in geographical as well as in geological journals. In geology, all such details are of course essential; but if they do not bear helpfully on an appreciation of the visible landscape, or on the conditions and activities of its occupants, they are distracting interruptions in an avowedly geographical essay, where their space can better be given to matter of a more strictly geographical nature.

A notable novelty in Albricht's article is the use of the words *vergraden* and *Vergradung,* apparently corresponding to the English words, grade and grading: a welcome novelty indeed, for hitherto, the German equivalent of a graded river has been *ein ausgeglichener Fluss;* now it might be *ein vergradener Fluss.* If *vergraden* is accepted, it would seem as if *aufgraden, abgraden, vorgraden zurückgraden,* and *wiedergraden* might also be used as equivalents of the useful terms, aggrade, degrade, prograde, retrograde and regrade, particularly as it is difficult to form these compound verbs, if the already compounded verb *ausgleichen,* as the translation of the English verb, to grade, is taken as their root.

W. M. DAVIS.